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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/926,033	11/07/2001	Takeshi Oohashi	011022	3978

38834 7590 09/20/2004

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EXAMINER

THORNTON, YVETTE C

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 09/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/926,033

Applicant(s)

OOHASHI ET AL.

Cp

Examiner

Yvette C. Thornton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-13,15-18 and 20-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-13,15-18 and 20-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

This is written in reference to application number 09/926033 filed on July 7, 2001 which is a 371 of PCT/JP00/01221 filed on March 2, 2000.

Request for Continued Examination

1. The request filed on July 15, 2004 for a Request for Continued Examination (RCE) under 37 CFR 1.53(d) based on parent Application No. 09/926033 is acceptable and a RCE has been established. An action on the RCE follows.

Oath/Declaration

2. The examiner acknowledges the declaration submitted pursuant to 37 CFR 1.132 by inventor Takeshi Oohashi on May 24, 2004.

Response to Amendment

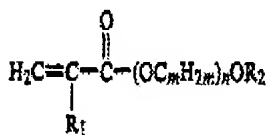
3. Claims 2, 14 and 19 have been cancelled. Claims 1, 3-13, 15-18 and 20-26 are currently pending.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3-13, 15-18, 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lipson et al. (EP 128014 A2) in view of Ishikawa et al. (JP 10-020491 A, machine translation). Lipson teaches a photopolymerization composition comprising (A) from 10-60 parts by weight (pbw) of an addition polymerization material comprised of (i) from 5-50 pbw of an acrylate of the formula:

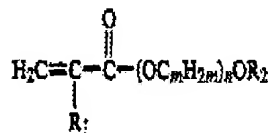


wherein m is 1-4, n is 1-12, R₁ is H, CH₃ and mixtures thereof and R₂ is

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selected from a substituted or unsubstituted phenyl, substituted or unsubstituted naphthenyl, a branched, unbranched, substituted or unsubstituted alkyl having 1-12 carbons, or a substituted or unsubstituted cycloalkyl group having 5-6 carbon atoms in the ring; and (ii) from 5-50 pbw of one or more non-gaseous compounds containing at least two terminal ethylenic groups and having a boiling point of 100°C; (B) from 0.001-20 pbw of a photoinitiated free radical generating addition polymerization initiating system; (C) from 0.001-5 pbw of a thermal addition polymerization inhibitor; and (D) from 40-90 pbw of a preformed macromolecular polymeric binding agent which is a polymer of (i) a first monomer material which contains one or more non-acidic compounds and (ii) a second monomer material which consists essentially of one or more ethylenically unsaturated carboxylic acid or anhydride containing monomers having 3-15 carbon atoms (see claim 1).

Example V exemplifies a composition comprising a copolymer of methyl methacrylate (35%), butyl methacrylate (11%), styrene (23%) and methacrylic acid (30%) in a solvent mixture of methyl ethyl ketone/isopropyl alcohol. It is the examiner's position that the said copolymer meets the limitation of a carboxyl group containing binder, which contains styrene or a styrene derivative. The said copolymer further meets the limitations of the instant claims 4, 16 and 21 wherein the methyl methacrylate (35%) and butyl methacrylate (11%) together meet the requirement of claimed monomer (III) in the amount of 30-75%. The composition of Example V further comprises phenoxydiethoxyethyl acrylate, which has the



formula

wherein $m=2$; $n=4$; and R_2 =unsubstituted phenyl group. Although

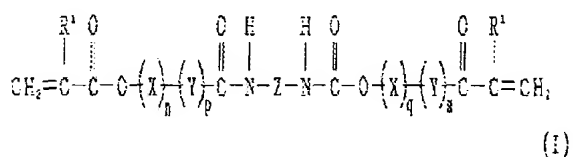
Lipson fails to exemplify a compound wherein n is anything other than 4, one of ordinary skill in the art would have readily envisaged each and every compound within the taught range of $n=1-12$ (pg. 7, l. 6-pg. 8, l. 10). It is the examiner's position that when n is in the range of 6-12 it anticipates the claimed range of the instant invention. Lipson teaches that the preferred acrylates are substituted and unsubstituted phenoxyethoxyethyl acrylates and substituted and unsubstituted phenoxypropoxypropyl acrylates

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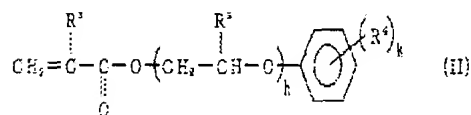
(pg. 9, l. 10-19). The substituents for the phenyl or naphthenyl groups are selected such that they do not substantially adversely affect the characteristics of the photopolymerizable composition and may be halogen (Cl, Br, I) groups, C1-15 alkyl groups and C1-15 alkoxy groups (pg. 8, l. 5-10). Examples of the substituted phenoxyethoxyethyl acrylate include chlorophenoxyethoxyethyl acrylate and methacrylate (pg. 8, l. 24-25).

The composition of example V was coated onto a polyester film, dried and covered with a polyethylene film (pg. 35, l. 5-pg. 36, l. 30). The polyethylene cover film is removed and the bared resist coating is laminated to a clean copper-clad epoxy fiberglass board. The resulting film is exposed to light through a high-contrast transparency. The polyester support film is peeled off and the exposed resist layer is developed and etched (pg. 28, l. 17-pg. 29, l. 24).

6. Lipson as discussed above teaches all the limitation of the instant claims except it fails to teach and/or suggest the use of a 2,4,5-triarylimidazole dimer as set forth in the instant claims. Lipson also fails to teach the use of a compound of formula (II) as in instant claims 3, 15 and 20. Ishikawa teaches a photosensitive resin composition comprising (A) a film forming polymer of (meth)acrylic alkyl esters and alkyl methacrylate ester, (B) a photopolymerization initiator, (C) a compound of general formula (I):



and (D) a compound of general formula (II):



(see claims; p. 0005-0006). X of formula (I) is -CH₂CH₂O, Y

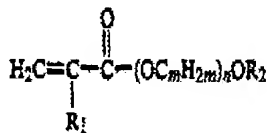
is selected from a 6 different C3-6 alkoxy groups, Z is a hydrocarbon group having 2-16 carbon atoms and n, m, p and q is an integer from 1-14. (p. 0005). It is the examiner's position that X and Y together meet the limitations of B1 and B2 of claimed formula II. One of ordinary skill in the art would have been motivated by the teachings of Ishikawa to incorporate a compound of general formula (I) into the taught

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composition of Lipson in order to increase the sensitivity, intensity and elongation of a the hardened film (see Ishikawa p. 0015).

Ishikawa also teaches that suitable examples of the taught photopolymerizable initiator (B) include aromatic ketones, benzoin ethers, 2,4,5-triarylimidazole dimers and acridine derivatives (p. 0011). It would have been obvious to one of ordinary skill in the art to use any photoinitiator, such as 2,4,5-triarylimidazole dimers, which are well known and conventional in the art in the composition of Lipson.

7. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lipson et al. (EP 128014 A2) in view of Ishikawa as applied to claims 1, 3-13, 15-18 and 20-23 above, and further in view of Kawashima (US 6048953 A). Lipson as discussed above teaches all the limitation of the instant claims except it fails to teach and/or suggest a composition further comprising 2,2-bis[4-(acryloxypolyethoxy)-phenyl]propane or 2,2-bis[4-(methacryloxypolyethoxy)phenyl]propane as set forth in instant claims 24-26. Lipson does however teach that the taught addition polymerization material comprises (i) from 5-50



pbw of an acrylate of the formula:

and (ii) from 5-50 pbw of one or more non-

gaseous compounds containing at least two terminal ethylenic groups and having a boiling point of 100°C.

Example of the non-gaseous compounds include ester of the methylene carboxylic acid such as diethylene glycol diacrylate and bis-acrylates and methacrylates of polyethylene and polypropylene glycols such as tripropylene glycol diacrylate (c. 5, l. 60-c. 6, l. 16).

Kawashima (US 6048953 A) teaches the use of a (meth)acrylic monomer (B) having at least one unsaturated double bond in its molecule to adjust the viscosity and the curability of the solvent-less liquid resin composition. Examples include diethylene glycol di(meth)acrylate, tripropylene glycol di(meth)acrylate, 2,2-bis[4-(acryloxypolyethoxy)phenyl]propane and 2,2-bis[4-(methacryloxypolyethoxy)phenyl]propane. It is the examiner's position that Kawashima serves to equate 2,2-bis[4-(acryloxypolyethoxy)phenyl]propane, 2,2-bis[4-(methacryloxypolyethoxy)phenyl]propane,

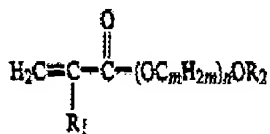
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diethylene glycol di(meth)acrylate and tripropylene glycol di(meth)acrylate in the art. Therefore, one of ordinary skill in the art would have been motivated to substitute 2,2-bis[4-(acryloxypolyethoxy)phenyl]propane or 2,2-bis[4-(methacryloxypolyethoxy)phenyl]propane for the taught diethylene glycol diacrylate and tripropylene glycol diacrylate of Lipson and expect reasonably similar results.

Response to Arguments

8. Applicant's arguments in regard to the rejections under 35 USC 102 in combination with the amendment to the instant claims are sufficient to overcome the 102 rejections set forth in the final rejection of 11242003.

9. Applicant's arguments filed May 24, 2004 have been fully considered but they are not persuasive. Applicants argue that the prior art reference of Lipson fails to disclose the specific components (C), (C') or (C'') in combination with the claimed dimer. Applicants also argue that Lipson fails to exemplify a compound wherein n is 6-12. The examiner is of the position that Lipson clearly teaches an acrylate of



the formula:

wherein m is 1-4, n is 1-12, R₁ is H, CH₃ and mixtures thereof

and R₂ is selected from a substituted or unsubstituted phenyl, substituted or unsubstituted naphthenyl, a branched, unbranched, substituted or unsubstituted alkyl having 1-12 carbons, or a substituted or unsubstituted cycloalkyl group having 5-6 carbon atoms in the ring. Example V exemplifies a compound wherein m=2, n=4 and R₂ is an unsubstituted phenyl group. The compound of example V is a preferred embodiment. Lipson further teaches that the preferred acrylates are substituted and unsubstituted phenoxy polyethoxyethyl acrylates and substituted and unsubstituted phenoxy polypropoxypropyl acrylates (pg. 9, l. 10-19). In light of the exemplified composition and the disclosure of Lipson, one of ordinary skill in the art would readily envisage a compound similar to that of example V wherein n is in the range of 6-12 and the phenyl is substituted or unsubstituted, which clearly anticipated the claimed invention.

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10. In regard to the rejections set forth under 35 USC 103, applicants argue that surprising and unexpected results from compounds within the claimed range. The declaration filed under 37 CFR 1.132 has been fully considered by the examiner and found to be not commensurate in scope with the instant claims. The said declaration only uses the preferred 2-(o-chlorophenyl)-4,5-dipenylimidazole dimer. However, the claims as written encompass a vast number of 2,4,5-triarylimidazole dimers. Furthermore, 2-(o-chlorophenyl)-4,5-dipenylimidazole dimer is the preferred component, which may produce enhanced results.

11. Applicants have also failed to compare the closest prior art of Lipson and Ishikawa. The declaration uses the composition of example 1 of the present specification with varying acrylate compounds. The examiner was unable to make a direct comparison of the claimed invention and the prior art. A better comparison would have been to make the composition of example V of Lipson and vary the acrylate component.


Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 571-272-1336. The examiner can normally be reached on Monday-Thursday 8-6:30.

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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14. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Yvette Clarke Thornton
Primary Examiner
Art Unit 1752

yct
September 16, 2004